REMARKS

Reconsideration of the Application is requested. Applicant will show that the cited combination of references would not have been obvious to one of ordinary skill in the art at the time of the invention. Additionally, Applicant will show that the combination of references are not enabling and would require undue experimentation to reduce to practice. Finally, as an alternative, secondary considerations are provided to show that the combination of references is non-obvious to one of ordinary skill in the art.

Claim Rejection 112

Claims 1-8, 10-16, 19-20, 22, 24-40, 41, 44-48, 51-55, 58-61, 67-71 are rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In response to the Office action mailed 8-30-02 in which at least claim 1 was rejected on several grounds substantially related to patentability, namely, 35 USC 112, second paragraph, and 35 USC 103(a), Applicant narrowed claim 1 by requiring that the sludge to be treated by the claimed invention must have been previously digested by a "thermophilic digestion process" operated at a specified minimum temperature. Specifically, the narrowing amendment limits the sludge that is to be dewatered by claimed dewatering method to sludges that had been digested by a "thermophilic digestion process at a temperature greater than about 115°F."

The foregoing reasons apply equally as well with respect to claims 15, 22, 33, 41, 48, 55 and 67 each if which recites the same "115°F" limitation, and claims dependent thereon.

Applicant's Response

Independent claims 1, 15, 22, 33, 41, 48, 55 and 67 have been amended to remove the reference to the temperature range that thermophilic bacteria operate.

All of Applicant's independent claims at least recite:

"adding a polymeric quaternary ammonium compound " to the thermophilic biological sludge or water containing thermophiles .

The claimed process will operate independently of the temperature in which the biological sludge is created. All the claims require the limitation for thermophilic biological sludge or thermophiles for dewatering. The range of temperatures that the thermophilic biological sludge is created was well known by those skilled in the art at the time the application was filed and is, thus, inherent in the definition of thermophilic. In fact, Applicant's own Background of the Invention teaches the following:

"Although there are different approaches to controlling pathogens in sewage sludge, each method relies on altering the sludge environment so that it becomes a less effective medium of microbial growth. At temperatures of at least about 115° F, active bacteria are of the **thermophilic variety**. Aerobic thermophilic microorganisms are used to carry out any required degradation in a thermophilic, exothermic process." (Emphasis added)

Similarly, other prior art references supported the above identified teachings. For example, US Patent 4,329,428 to Ghosh et al. disclosed: "The anaerobic digestion of plant material and organic waste according to this invention comprising anaerobic digestion of a mixture of plant material and organic waste and removal of methane containing gas from the digestion zone may be carried out under conditions of temperature, both mesophilic (about 20° to 45° C) and thermophilic (**about 45°to 70°C**); detention times in excess of about 5 days and usually about 8 to 30 days, preferably about 11 to 16 days; loading rates; pretreatment of

feed; digester mixing and recycling as known to the art for anaerobic digestion and pointed out more particularly in the references identified above. The present invention may be readily applied to multistage digestion, such as exemplified by our earlier U.S. Pat. No. 4,022,665." (Emphasis added.)

In US Patent 4,246,099 Gould et al. disclosed: "As an alternative to the foregoing methods, biodegradable sludge can be digested aerobically. Air has commonly been employed in practice as the oxidant for this purpose. It is known that aerobic digestion proceeds more rapidly at elevated temperatures. As temperature rises from 35°C, the population of mesophilic microorganisms decline and thermophilic forms increase. The temperature range of **45°C to 75°C** is often referred to as the thermophilic range where thermophiles predominate and where most mesophiles are extinct. Above this range, the thermophiles decline, and at 90°C, the system becomes essentially sterile. Because of the more rapid oxidation of sludge, thermophilic digestion achieves more complete removal of biodegradable volatile suspended solids than the same period of digestion at ambient temperature. A more stable residue is obtained which can be disposed of without nuisance. It is also established that thermophilic digestion can effectively reduce or eliminate pathogenic bacteria in the sludge, thereby avoiding the potential health hazard associated with its disposal." (Emphasis Added.)

Thus, the range of thermophilic digestion operation was well known in the art at the time the application was filed, and one skilled in the art can select the appropriate operating temperature to generate thermophiles given the teachings of the prior art.

37 CFR 1.121(b)(2)

Claim 15 is objected to under 37 CFR 1.121(b)(2).

Applicant's Response

Claim 15 was amended to its original form. This amendment was necessitated by the amendment to claim 1, to which claim 15 depends.

37 CFR 1.121(b)(2)

The rejection of claims 22, 24-32 under 112, first paragraph, written description, and objection thereto under 251 and 132, is maintained for the reasons given there.

Applicant's Response

Claim 22, has been amended to claim "A method for treating a sludge comprising water and solids, wherein the solids comprise thermophiles, the method comprising: contacting the sludge according to a technique selected from a group of techniques including; contacting with a polymeric quaternary ammonium compound along with a polyacrylamide to form a treated sludge and contracting of the sludge first with the polymeric quaternary ammonium compound and then with the polyacrylamide."

35 USC 112

Claims 2, 26, 30, 44, 51 and (36, 39, 58, 68) are rejected under 35 USC 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter for which patent protection is sought. The statement and discussion of the rejection as it applies from pages 9 and 10 of the last action is incorporated herein.

Applicant's Response

Webster's Encyclopedia an Unabridged Dictionary of the English Language, 2nd ed., Gramercy Books, a division of Random House Publishing (1996), p.58 defines Allyl as "a substance containing the allyl group and Allyl group: as $[CH_2=CH-CH_2]^+$ ".

For example

- Butyl $[CH_2=CH-CH2-CH2]^+$
- Butyl, 2° carbon $[CH2-CH=CH-CH2]^+$, along with the previously discussed or
- Propyl $[CH_2=CH-CH_2]^+$.

May be combined with di-methyl amine to create 3 family members. Thus one of ordinary skill in the art could practice Claims 2, 26, 30, 44, 51 and (36, 39, 58, 68) and would understand their limitations.

35 USC 112

Claim 4 is rejected under 35 USC 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter for which patent protection is sought.

In substance, step (a) of Claim 4 cannot be understood.

Applicant's Response

Claim 4 has been amended to read as follows: "The method for dewatering biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is added directly to the sludge, following the formation of microflocs of the sludge from the addition of the polymeric quaternary ammonium compound, the polyacrylamide is added."

35 USC 112

Claim 16 is rejected under 35 USC 112, second paragraph, as failing to particularly point out and distinctly claim the subject matter for which patent protection is sought.

Claim 16 is unclear whether only the polymeric quaternary ammonium compound must be used in either solution form or in dry form, or whether both the polyacrylamide and polymeric quaternary ammonium compound must be used in either solution form or in dry form, or whether both the polyacrylamide and polymeric quaternary ammonium compound must be used in either solution form or in dry form. It is suggested that "is" be changed to "are".

Applicant's Response

Claim 16 has been amended to read as follows: "The method for dewatering biological sludge according to claim 1, wherein the polymeric quaternary ammonium compound is used in solution or in dry form."

35 USC 103

Claims 1, 3-8, 10-16, 19-20, 22, 24-41, 44-48, 51-55, 58-61, 67-71 are rejected under 103 over Dentel, Gould, and Buckman for the reasons given in the previous Office Action (at pgs. 13-16).

Applicant's Response

For the purpose of discussion, Applicant will use claim 1 as a guide. Claim 1as well as all of the independent claims, require at least thermophiles or a biological sludge that has been digested by a thermophilic digestion process and the contacting of the sludge or thermophiles with a polymeric quaternary ammonium compound. As an example claim 1 claims: "A method for dewatering biological sludge that has been digested by a thermophilic

digestion process, comprising:

a. adding a polymeric quaternary ammonium compound, as primary component, to the biological sludge; and

b. adding a polyacrylamide to the biological sludge;

such that any combination of the polymeric quaternary ammonium compound and of the polyacrylamide enhances dewatering of the sludge."

However, the following discussion applies equally to independent claims 22, 41, 48 and 55 and as far as Dentel and Gould to independent claims 33 and 67.

The combination of Dentel, Gould and Buckman would not have been obvious to one of ordinary skill in the art because it was generally known by those of ordinary skill in the art that thermophiles or thermophilic biological sludge was not easily dewaterable. One of ordinary skill in the art would be a person with a degree in environmental science, or many years of on the job training plus state certification. At the time of the conception and reduction to practice of the claimed invention, one of ordinary skill in the art would have knowledge of the Environmental Protection Agency (EPA) and its rules, regulations and recommendations. In particular, one of ordinary skill in the art would have knowledge of an EPA publication:

TBS Prakasam, S Soszynski, DR Zenz, C Lua-Hing, L Blyth, and G Sernel, *Effect of Recycling Thermophilic Sludge on the Activated Sludge Process,* EPA Project Summary 5, Sept. 1990. Which stated under the heading:

"Dewaterability

Capillary suction time (CST) measurements at various polymer dosages indicated that mesophilic sludge required a lower polymer dosage than did the thermophilic sludge (10 vs. 22.5 kg/dry tonne) to achieve the minimum CST that was possible. The thermophilic sludge, however, exhibited a higher floc strength than did the mesophilic sludge.

Pilot scale centrifuge studies confirmed that the thermophilic sludge required a higher polymer dosage than did the mesophilic sludge. At optimum polymer dosages, those studies also indicated that the mesophilic sludge approached 100% solids capture whereas the thermophilic solids approached a maximum of 96% solids capture. The lower solids capture with thermophilic sludge probably resulted from the higher concentration of fine particles in it than in the mesophilic sludge." and recommended that:

"Based on the lack of effect on sludge mass end the increase in digestion capacity required, the Torpsy process is not recommended for Chicago's conventional rate activated sludge plants. Nor is thermophilic digestion as the terminal sludge digestion process recommended if the sludge is to be used at a site with nearby neighbors."

Thus, when the reference to Gould states: "The major reasons for commercial acceptance of anaerobic sludge digestion are that this method is capable of stabilizing large volumes of dilute organic slurries, results in low biological solids (biomass) production, produces a relatively easily dewaterable sludge and is a producer of methane gas." (Emphasis added.) One of ordinary skill in the art would know that Gould et al. was not referring to thermophiles or thermophilic biological sludge. Therefore, the difference between Gould et al. and Applicant's claims is that all of Applicant's claims apply to thermophiles or thermophilic biological sludge, and the skilled practitioner would know that Gould et al, reference was not referring to thermophiles or thermophilic biological sludge when it stated: " ....this method is capable of stabilizing large volumes of dilute organic slurries, results in low biological solids (biomass) production, produces a relatively easily dewaterable sludge and is a producer of methane gas."

Applicant, in his Background of the Invention , explained why dewatering thermophilic biological sludge is difficult (i.e. Column 2 lines 33-36): "This repelling nature of

thermophilic bacteria makes the dewatering of sludge from the thermophilic digestion process expensive and difficult."

Even as late as 2000, a paper given at WEFTEC by scientist at Virginia Polytechnic Institute concluded that: "Thermophilic anaerobic digestion results in poor sludge dewatering characteristics."

Conclusion, the ordinary skilled practitioner would know that thermophilic biological sludge is not easily dewaterable and consequently Gould et al. does not teach or suggest Applicant's claimed inventions.

The reference to Buckman et al. teaches in the Abstract: "Water-soluble polymeric mixtures prepared by mixing 1 to 10 parts by weight of a quaternary ammonium polymer with 0.5 to 7 parts by weight of a high molecular weight nonionic and/or cationic vinyl-addition polymer, and 0.1 to 5 parts by weight of a nonionic and/or cationic surfactant have utility in many diverse applications." and further in column 1 line 12 that: "In addition, said polymers are useful in dewatering sewage sludge ....." However, Buckman et al.'s reference does not teach nor disclosed the treatment of thermophilic biological sludge and in view of the above discussion the combination of Gould et al. with Buckman et al. would not have been obvious to one of ordinary skill in the art.

There would have been no motivation to combined Buckman et al. with the reference to Gould et al. because Buckman et al. only teaches that "said polymers are useful in dewatering sewage sludge" and one of ordinary skill in the art would know that thermophiles or thermophilic biological sludge has poor sludge dewatering characteristics and conclude that Buckman et al. was not referring to the dewatering of thermophiles or thermophilic biological sludge.

Even if the combination of Gould et al. was suggested, Applicant's invention would still be novel over the combination of Gould and Buckman as Buckman teaches the use of three to five chemical components, as compared to the one or two chemical components claimed by Applicant in his independent claims. Thus, the inventions claimed by Applicant in independent claims 1, 22, 33, 41, 48, 55 and 67 would not have been obvious to one of ordinary skill in the art at the time the inventions were made.

Finally, there would have been a lack of motivation for one of ordinary skill in the art to combine Gould and Buckman with Dentel et al. not only for the reasons discussed above but also because Dentel does not prefer either HDTMA or ferric chloride. See page 6 which states: "Figures 1 and 2 show the results of conditioning and dewatering results for both the EBMUD and Philadelphia sludges, when conditioned with Percol 757, ferric chloride, or HDTMA individually. These results once again confirm that cationic polymers are very effective in sludge conditioning when compared to the inorganic chemical conditioning with ferric chloride. Use of a cationic surfactant in sludge conditioning is unconventional, but its optimum does on a mass basis when comparable to that of ferric chloride. However, this finding is of little practical use since HDTMA is significantly more expensive than ferric chloride or flocculant polymers per unit mass."

One of ordinary skill in the art would be either employed by a municipality or industry in the environmental services center, or a supplier to one of those organizations. The disposal of sewage is a tax burden to municipalities and a cost burden to industry. Both would prefer to dump the sewage into the closest stream and let the down stream inhabitants worry about the disposal problem. It is only because of state and federal regulations that either is taking corrective action. Therefore, financial considerations would be important to a person of ordinary skill in the art. The above quoted EPA report stated that: "At optimum polymer

dosages, those studies also indicated that the mesophilic sludge approached 100% solids capture whereas the thermophilic solids approached a maximum of 96% solids capture." The 96% solids capture would require the additional and substantial expense of recirculating the additional solids, sludge, through the treatment facility. Due to this cost factor, a person of ordinary skill, upon reading the Dentel reference and having knowledge of the EPA report, would be led in a direction divergent from the path that was taken by Applicant.

Additionally, the combination of references would not be obvious to one of ordinary skill in the art to practice and the claimed inventions could not be achieved without undue experimentation. The experimentation expectation is accurately confirmed by Dentel et al. on page 2 which states:

"The means by which chemical conditioners interact with the colloidal phase in biological suspensions to facilitate the release of water is poorly understood, with the optimal amounts and types of conditioners required depending on a variety of factors. These include both aqueous and surface chemistries of the sludge, and the physical properties of the suspended solids, which are determined by characteristics of the original wastewater and by the operational parameters for the various treatment processes employed in the plant. Also important is the chemistry of any chemical conditioner used, and how it interacts with the bio-solids.

Thus, **the conditioning process is a multivariate problem with no simple strategy available for its optimization**. At present, the required dosages for chemical conditioning must be determined empirically. With this being the case, the use of multiple chemical additives becomes less feasible because of the difficulty in identifying a proper dose combination." (Emphasis added.)

Thus, the quantity of experimentation necessary to achieve Applicant's claimed inventions is substantial. At the time of the reduction to practice by Applicant, there would have been no direction or guidance provided by the prior art. There were no successful examples; just the opposite as demonstrated in the EPA document. The claims relate to treatment of sewage and thus, to experiment would require the availability of a sewage treatment plant and the financial resources necessary to obtain the different chemical compounds and to carry out the experimentation. Prior to Applicant's disclosures, the cause of the difficulty of treating thermophilic sludge was not known and thus, the teachings of the prior art were unpredictable; compare the difference between Gould et al. and the EPA reference. Applicant's claims are species claims and would require additional experimentation to be reduced to practice as compared to generic claims. The skill of the practitioner was previously defined as an environmental engineer or scientist and thus would only have a limited knowledge of organic chemistry and microbiology. Consequently, one of ordinary skill in the art would not have enough in depth knowledge to understand the working of Applicant's claimed invention.

In conclusion, the cited combination of references does not teach the treatment of thermophilic biological sludge and consequently neither teaches nor suggests the method of "adding a polymeric quaternary ammonium compound, as primary component, to the biological sludge; and adding a polyacrylamide to the biological sludge; such that any combination of the polymeric quaternary ammonium compound and of the polyacrylamide enhances dewatering of the sludge."

In view of the above stated fact, claims 1, 3-8, 10-16, 19-20, 22, 24-41, 44-48, 51-55, 58-61, 67-71 should be allowable over the combination of Dentel, Gould, and Buckman.

35 USC 103

Claim 2 is rejected under §103 over Dentel, Gould, Buckman and either Rosencrance or Hurlock for the reasons given in the previous Office Action.

Applicant's Response

Claim 2 claims the steps of claim 1, to which it depends and additionally claims: "wherein the polymeric quaternary ammonium compound is from the di-allyl di-methyl ammonium chloride (DADMAC) family." The reasons discussed above are incorporated herein. Neither Rosencrance nor Hurlock teach the treatment of thermophilic sludge and thus any such combination would not be obvious to one of ordinary skill in the art, as evidenced by the fact that one of ordinary skill in the art would know that thermophilic biological sludge is not easily dewatered. That any results would require extensive experimentation and consequently the combination of references is not enabling.

35 USC 103

Claims 1, 2, 4, 7, 16, 22, 24 – 32 are rejected under 35 USC 103(a) over Chitikela in view of Chung for the reasons beginning at page 17 of the last Office Action.

Applicant's Response

Chung et al. teaches: "An improved method for dewatering aqueous sludge is disclosed comprising flocculating the sludge by the addition of effective amounts of chitosan and an organic dialdehyde such as glutaraldehyde to the sludge, which is also preferably acidified to about pH 6.0."

Chitikela is essentially the same article as the above referenced article to Dentel, and as such the previous arguments apply. "Figure 1 shows the results of conditioning and dewatering results for the EBMUD sludges, when conditioned with Percol 757, ferric

chloride, or HDTMA individually. These results once again confirm that cationic polymers are very effective in sludge conditioning when compared to the inorganic chemical conditioning with ferric chloride. Use of a cationic surfactant in sludge conditioning is unconventional, but its optimum does on a mass basis was comparable to that of ferric chloride. However, this finding is of little practical use since HDTMA is significantly more expensive than ferric chloride or flocculant polymers per unit mass." As with the Dentel reference one of ordinary skill in the art would seek a solution divergent from that of applicant's because the cost factors.

Neither Chitikela nor Chung teach or suggest: "A method for dewatering biological sludge that has been digested by a thermophilic digestion process comprising: adding a polymeric quaternary ammonium compound, as primary component, to the biological sludge; and adding a polyacrylamide to the biological sludge; such that any combination of the polymeric quaternary ammonium compound and of the polyacrylamide enhances dewatering of the sludge.", or any of the other similarly worded claims.

The combination would not have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would know that thermophilic biological sludge has poor sludge dewatering characteristics and that the combination would be non-enabling because of the previously discussed reasons.

35 USC 103

Claim 14 is rejected under 35 USC 103(a) over Chitikela and USP 5451326 to Carlson, as applied above, further in view of USP 4329428 to Ghosh, for the reasons at page 21 of the last Office Action.

Applicant's Response

One of ordinary skill in the art would not consider the referenced to Ghosh et al. to be relevant because it teaches that thermophilic digestion sludge may be easily dewatered, which according to the above cited EPA reference, this is not the case. In fact the only dewatering process described by Ghosh is a vacuum process. See column 6, lines 47-51 which states: "The effluent form the anaerobic digestion of a mixture of plant material and organic waste has a low concentration of soluble organics indicating low ultimate disposal cost and the feasibility of its recycle to the anaerobic digester with little or no treatment. The digester effluent, although, dilute, can be dewatered directly by vacuum filtration to provide cake-solids content and cake yield comparable to that of filtered, digested sewage sludge." In the same cited section it is suggested that little or no treatment is required.

One of ordinary skill in the art also would understand from the above EPA reference that the difficulty with thermophiles is as stated above: "The lower solids capture with thermophilic sludge probably resulted from the higher concentration of fine particles in it than in the mesophilic sludge." However, in Gosh et al., the fine particles are desirable for the making of SNG. See column 3 lines 27-37 which states: "Digester feed for anaerobic digestion was prepared by reducing water hyacinth and grass to fine particles by fine extrusion cutting to liberate the cellulose fraction of the fibers from the lignin coating; municipal solid waste was air separated and reduced to fine organic-rich particles by two-stage hammer-milling; activated sewage sludge was concentrated by vacuum filtration resulting in solids

contents of 62.5 weight percent volatile solids of total solids; and primary sludge was concentrated by centrifugation to 68.2 weight percent volatile solids of total solids." Thus, the ordinary skilled practitioner would not consider the Gosh et al. reference, and not be motivated to treat the sludge with any chemical compound and to combine the reference with Carlson or Chitikela.

Additionally, Carlson discloses: "The present invention provides a method for treating food processing wastes. Pursuant to the method, the food processing waste is treated with an effective amount of a dispersion of a water-soluble cationic polymer flocculant. In further embodiments, the method of the present invention includes the further steps of adding effective amounts of both a coagulant and flocculant in combination or separately." The coagulants recommended by Carlson are on column 6 line 24-32: "Examples of suitable coagulants that may be used in the present invention include: ferric sulfate, ferrous sulfate, aluminum sulfate, aluminum chloride, polyaluminum chloride, ferrous chloride, ferric chloride, aluminum chlorohydrate, ethylene-dichloride/ammonia polymers, melamine/formaldehyde polymers, and epichlorohydrin-dimethylamine condensation polymers in liquid form; poly-diallyldimethyl ammonium chloride in liquid or solid form; and mixtures thereof."

Carlson does not teach or suggest the treatment of the digested material of Ghosh et al. with a polymeric quaternary ammonium compound. Ghosh et al. does not teach or suggest that the digested material required treatment. Thus, the combination of the cited references would not be obvious to one of ordinary skill in the art, and claim 14 which claims: "The method for dewatering biological sludge according to claim 1, wherein the biological sludge is mixed with primary sludge." is non-obvious. Additionally, the teachings of Chitikela as discussed in conjunction with the reference to Dentel would not enable the skilled practitioner

to practice the claimed invention without undue experimentation. The undue experimentation burden is further supported by Carlson which provides a smorgasbord of chemical compounds with no guidance about the preferred chemical for the treatment of biological sludge.

35 USC 103

Claims 1-4, 7, 16, 22, 24-32 are rejected under 35 USC 103(a) over Chitikela in view of USP 5451326 to Carlson, for the reasons at pages 20-21 of the last Office Action.

Applicant's Response

The combination of Chitikela in view of Carlson do not teach or suggest: "A method for dewatering biological sludge that has been digested by a thermophilic digestion process, comprising: adding a polymeric quaternary ammonium compound, as primary component, to the biological sludge; and adding a polyacrylamide to the biological sludge; such that any combination of the polymeric quaternary ammonium compound and of the polyacrylamide enhances dewatering of the sludge" or any of the other similarly worded claims for the reasons discussed above. Additionally, the teachings of Chitikela as discussed above would not enable the skilled practitioner to practice the claimed invention without undue experimentation.

35 USC 103

Claim 14 is rejected under 35 USC 103(a) over Chitikela and USP 5451326 to Carlson, as applied above, further in view of USP 4329428 to Ghosh, for the reasons at page 21 of the last Office action.

Applicant's Response

Claim 14 claims: "The method for dewatering biological sludge according to claim 1, wherein the biological sludge is mixed with primary sludge." The combination of Chitikela

and USP 5451326 to Carlson, as applied above, further in view of USP 4329428 to Ghosh is non obvious.

Gosh et al. in the Abstract states: "A process for improved methane production resulting in higher yield and higher production rates by anaerobic digestion of a mixture of plant material and organic waste...The process of this results in digester effluent which is easily dewatered and has a low concentration of soluble organic matter, providing easy disposal and recycling to the digester." Thus, one of ordinary skill in the art would disregard Gosh et al. as an enabling reference because of the EPA document referenced above. The combination of references would not be considered because of this reason.

35 USC 103

Claims 1-6, 7, 16, 22, 24-32 are rejected under 35 USC 103(a) over Chitikela in view of USP 5035808 to Hassick or USP 4450092 to Huang, for the reasons at page 21-23 of the last Office Action.

Applicant's Response

The combination of Chitikela in view of Hassick or Huang do not teach or suggest: "A method for dewatering biological sludge that has been digested by a thermophilic digestion process comprising: adding a polymeric quaternary ammonium compound, as primary component, to the biological sludge; and adding a polyacrylamide to the biological sludge; such that any combination of the polymeric quaternary ammonium compound and of the polyacrylamide enhances dewatering of the sludge" or any of the other similarly worded claims. The Chitikela reference would not be considered because it does not agree with the EPA reference and both Hassick and Huang teach how to treat turbid waters.

For example US patent 5,035,808 teaches: "The use as flocculants of ferric salt/water-soluble cationic polymer compositions having inorganic:polymer weight ratios of at least 5:1 is disclosed. These compositions are especially effective in low turbidity waters." This reference deals with the settling out of suspended particles from water. This is entirely different from the dewatering of thermophilic biological sludge and thus, the combination of this reference with Chitikela would not have been obvious to one of ordinary skill in the art.

Similarly, Huang teaches in the abstract: "Compositions useful for coagulating finely divided solids in turbid water are prepared by mixing or blending together inorganic water soluble compounds such as aluminum chloride, aluminum sulfate, ferric chloride or ferric sulfate and water soluble organic positively charged polymeric coagulants having an average molecular weight of at least 2000 which is poly diallyl dimethyl ammonium chloride polymer. The composition is especially useful for treating low turbidity water, for example, waters having a turbidity of 20 NTU (nephelometric turbidity units)." This reference deals with the settling out of suspended particles from water. This is entirely different from the dewatering of thermophilic biological sludge and thus, the combination of this reference with Chitikela would not have been obvious to one of ordinary skill in the art

The combination would not have been obvious to one of ordinary skill in the art based on the previous discussions on the Chitikela reference and further because of the reasons discussed above.

35 USC 103

Claim 14 is rejected under 35 USC 103(a) over Chitikela and Hassick or Chitikela and Huang, as applied above, further in view of Ghosh '428 for the reasons at page 23 of the last Office Action.